PATENT
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Claims:

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1. A receiver of global positioning system (GPS) signals comprising:

a decimation circuit for producing a subsampled in-phase (I) signal and a subsampled quadrature (Q) signal from received GPS signals;

a quantizer for producing quantized I and Q samples from the subsampled I and Q signals;

a convolution processor for producing I and Q correlations.

2. The receiver of claim 2 wherein the quantized I and Q samples are represented using two bits.

3. The receiver of claim 1 wherein the quantizer produces the quantized I and Q samples by assigning each sample of the subsampled I and Q signals to one of a plurality of bins in accordance with one or more magnitude thresholds.

4. The receiver of claim 3 wherein samples of the subsampled I and Q signals having a zero value are assigned to one of the plurality of bins in a substantially random manner.

5. The receiver of claim 3 wherein samples of the subsampled I and Q signals having a zero value are assigned to one of the plurality of bins according to a repeating pattern.

6. The receiver of claim 1 further comprising a second quantizer for quantizing the I and Q correlations.

7. A method of receiving global positioning system (GPS) signals comprising:

decimating received GPS signals to produce a subsampled in-phase (I) signal and a subsampled quadrature (Q) signal;

quantizing the subsampled I and Q signals to produce quantized I and Q samples;

multiplying a C/A reference code with the quantized I and Q samples to

produce I and Q correlations.

8. The method of claim 7 wherein the step of quantizing the subsampled I and Q signals further comprises representing the I and Q samples with two bits.

9. The method of claim 7 wherein the quantized I and Q samples are produced by assigning each sample of the subsampled I and Q signals to one of a plurality of bins in accordance with one or more magnitude thresholds.

10. The method of claim 9 wherein samples of the subsampled I and Q signals having a zero value are assigned to one of the plurality of bins in a substantially random manner.

11. The method of claim 9 wherein samples of the subsampled I and Q signals having a zero value are assigned to one of the plurality of bins according to a repeating pattern.

12. The method of claim 7 further comprising quantizing the I and Q correlations.

13. A receiver of global positioning system (GPS) signals comprising:

a decimation circuit for producing a subsampled in-phase (I) signal and a subsampled quadrature (Q) signal from received GPS signals;

a convolution processor for producing I and Q correlations;

a divider for reducing the number of bits of precision of the I and Q correlations to produce quantized I and Q correlations;

a signal normalizer for normalizing the quantized I and Q correlations to produce complex magnitude values; and

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a magnitude accumulator for summing the complex magnitude values.

14. A receiver of global positioning system (GPS) signals comprising:

a decimation circuit for producing a subsampled in-phase (I) signal and a subsampled quadrature (Q) signal from received GPS signals;

a convolution processor for producing I and Q correlations;

a magnitude approximation circuit for normalizing the I and Q correlations to produce complex magnitude values; and

a magnitude accumulator for summing the complex magnitude values.

15. The receiver of claim 14 wherein the magnitude approximation circuit produces the complex magnitude values by individually computing the absolute value of the I and Q values and outputting $|I|+\frac{1}{2}|Q|$ when $|I|\geq|Q|$, and $|Q|+\frac{1}{2}|I|$ when $|Q|>|I|$.

16. A receiver of global positioning system (GPS) signals comprising:

a decimation circuit for producing a subsampled in-phase (I) signal and a subsampled quadrature (Q) signal from received GPS signals;

a convolution processor for producing I and Q correlations;

a signal normalizer for normalizing the quantized I and Q correlations to produce complex magnitude values;

a magnitude accumulator for summing subsets of the complex magnitude values; and

a minimum value register for storing a minimum magnitude value for each of the subsets of complex magnitude values to produce an offset, and for subtracting the offset from the complex magnitude values.

17. The receiver of claim 16 further comprising an offset value register for accumulating offsets stored in the minimum value register.